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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| EXAMINER | |
|---|---|
| BURD, KEVIN MICHAEL | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2631 | 18 |

DATE MAILED: 07/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 09/389,289 | TSUMURA, SOICHI | |
| | Examiner | Art Unit | |
| | Kevin M. Burd | 2631 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *27 April 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-8* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *02 September 1999* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

1. This office action, in response to the amendment filed 4/27/2004, is a final office action.

***Response to Amendment***

2. Applicant's arguments filed 4/27/2004 have been fully considered but they are not persuasive.

Applicant states Applicant's newly added feature of "wherein oversampling occurs at the sampling point that coincides with a maximum eye pattern between the pilot symbols" is not taught by the previously cited references. However, Chalmers states sampling occurs at the maximum opening of the receiver eye pattern in column 13, lines 19-24. Chalmers also states in column 9, line 66 to column 10, line 1, oversampling occurs in the system. If sampling occurs at the maximum opening of the receiver eye pattern and oversampling is done in the system, then the sampling point is an oversampling point as well.

Applicant also states Chalmers does not disclose "a transmission phase error is minimized by discretely changing the transfer function in the transmitting reception sections of the radio communication system at the middle point between pilot symbols sandwiching the data symbol. The transmission error is caused by the fact that an oversampling point with respect to pilot symbol sandwiching the data symbol is different" on page 8 of the response. These limitations are not found in claims 1-7. In response to applicant's argument that the references fail to show certain features of

applicant's invention, it is noted that the features upon which applicant relies (i.e., a transmission phase error is minimized by discretely changing the transfer function in the transmitting reception sections of the radio communication system at the middle point between pilot symbols sandwiching the data symbol. The transmission error is caused by the fact that an oversampling point with respect to pilot symbol sandwiching the data symbol is different) are not recited in the rejected claims 1-7. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Claim 8 recites the phrase "wherein a reference phase error and a reproduced data error rate are minimized". Chalmers discloses the symbol timing phase can be adjusted quite easily by merely shifting the samples in time in column 13, lines 27-30. This shift is to correct for errors in the timing phase with a resolution that is sufficient that timing phase errors will cause a negligible loss in BER performance (column 13, lines 30-34). The circuit shifts the sampling timing phase so that the sampling timing phase occurs at the maximum opening of the receiver eye pattern (column 13, lines 19-21). Therefore, the phase errors are minimized and the shifting takes place to minimize ISI so the data error rate will also be minimized.

Applicant states on pages 8 and 9 of the response that "at no point does Chalmers discuss the minimization of phase error by discretely changing the transfer functions in the transmitting and reception sections of the radio communication system by ensuring that the oversampling point coincides with the maximum eye pattern as explicitly stated in Applicant's claim". However, Claim 8 recites "wherein a reference

phase error and a reproduced data error rate are minimized wherein the oversampling point coincides with a maximum eye pattern between the pilot symbols". Both of these limitations have be address in the above paragraphs.

The newly added limitation to the claims has been addressed in the following rejections of the claims. The rejections of the claims are maintained.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1, 5 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miya et al (US 6,351,458) in view of Chalmers (US 5,375,146).

Regarding claims 1, 5 and 8, Miya discloses an interpolation type synchronous detection system (column 3, lines 1-19). Pilot symbols are periodically interpolated in information symbols to be transmitted, the transfer function is estimated and detection is carried out. Figure 11 illustrates an example of the channel format. Miya does not disclose updating at a middle point of the data frame a reception sampling point. However, Chalmers discloses the circuit shifts the sample timing phase so that the sampling occurs at the maximum opening of the receiver eye pattern (i.e. sampling in the middle of a digital symbol) to minimize intersymbol interference (column 13, lines

19-23), thereby reducing the data error rate. This allows the interpolation synchronous detection in the receiver (column 14, lines 34-38). Chalmers also states in column 9, line 66 to column 10, line 1, oversampling occurs in the system. If sampling occurs at the maximum opening of the receiver eye pattern and oversampling is done in the system, then the sampling point is an oversampling point as well. It would have been obvious of one of ordinary skill in the art to shift the sample timing phase so the sampling occurs at the middle point to minimize intersymbol interference as disclosed by Chalmers in the method and system of Miya.

4. Claims 2, 4 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miya et al (US 6,351,458) in view of Yamada et al (US 5,822,364) further in view of Chalmers (US 5,375,146).

Regarding claims 2, 4 and 7, Miya discloses an interpolation type synchronous detection system (column 3, lines 1-19). Pilot symbols are periodically interpolated in information symbols to be transmitted, the transfer function is estimated and detection is carried out. Figure 11 illustrates an example of the channel format. Miya does not disclose using the complex conjugate for performing the coherent detection. Yamada discloses the demodulated data is obtained after completion of the pilot coherent detection scheme with interpolation using the complex conjugate as stated in column 1, lines 11-38. This is a critical component of correctly computing the coherent detection. It would have been obvious for one of ordinary skill in the art at the time of the invention to combine the coherent detection scheme of Yamada into the detection scheme of Miya

to ensure the correct values are detected. In addition, Miya does not disclose updating at a middle point of the data frame a reception sampling point. However, Chalmers discloses the circuit shifts the sample timing phase so that the sampling occurs at the maximum opening of the receiver eye pattern (i.e. sampling in the middle of a digital symbol) to minimize intersymbol interference (column 13, lines 19-23). This allows the interpolation synchronous detection in the receiver (column 14, lines 34-38). Chalmers also states in column 9, line 66 to column 10, line 1, oversampling occurs in the system. If sampling occurs at the maximum opening of the receiver eye pattern and oversampling is done in the system, then the sampling point is an oversampling point as well. It would have been obvious of one of ordinary skill in the art to shift the sample timing phase so the sampling occurs at the middle point to minimize intersymbol interference as disclosed by Chalmers in the method and system of the combination of Miya and Yamada.

5. Claims 1, 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vasic (US 6,178,194) in view of Chalmers (US 5,375,146).

Regarding claims 1 and 5, Vasic discloses a receiver, which interpolates the channel measurement provided by the pilot symbols to obtain a phase and amplitude reference for coherent detection (column 3, lines 16-19). The transfer function of the channel is estimated by using the pilot symbols and the data symbols are detected on the basis of the estimated transfer function (column 3, lines 14-32). The data channel is shown in figure 1. Vasic does not disclose updating at a middle point of the data frame a

reception sampling point. However, Chalmers discloses the circuit shifts the sample timing phase so that the sampling occurs at the maximum opening of the receiver eye pattern (i.e. sampling in the middle of a digital symbol) to minimize intersymbol interference (column 13, lines 19-23). This allows the interpolation synchronous detection in the receiver (column 14, lines 34-38). Chalmers also states in column 9, line 66 to column 10, line 1, oversampling occurs in the system. If sampling occurs at the maximum opening of the receiver eye pattern and oversampling is done in the system, then the sampling point is an oversampling point as well. It would have been obvious of one of ordinary skill in the art to shift the sample timing phase so the sampling occurs at the middle point to minimize intersymbol interference as disclosed by Chalmers in the method and system of Vasic.

Regarding claim 6, Vasic discloses a closed loop system that controls the gain in order to maintain optimal transmit power (column 2, lines 49-67).

6. Claims 2-4 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vasic (US 6,178,194) in view of Yamada et al (US 5,822,364) further in view of Chalmers (US 5,375,146).

Regarding claims 2, 4 and 7, Vasic discloses a receiver, which interpolates the channel measurement provided by the pilot symbols to obtain a phase and amplitude reference for coherent detection (column 3, lines 16-19). The transfer function of the channel is estimated by using the pilot symbols and the data symbols are detected on the basis of the estimated transfer function (column 3, lines 14-32). The data channel is

shown in figure 1. Vasic does not disclose using the complex conjugate for performing the coherent detection. Yamada discloses the demodulated data is obtained after completion of the pilot coherent detection scheme with interpolation using the complex conjugate as stated in column 1, lines 11-38. This is a critical component of correctly computing the coherent detection. It would have been obvious for one of ordinary skill in the art at the time of the invention to combine the coherent detection scheme of Yamada into the detection scheme of Vasic to ensure the correct values are detected. In addition, Vasic does not disclose updating at a middle point of the data frame a reception sampling point. However, Chalmers discloses the circuit shifts the sample timing phase so that the sampling occurs at the maximum opening of the receiver eye pattern (i.e. sampling in the middle of a digital symbol) to minimize intersymbol interference (column 13, lines 19-23). This allows the interpolation synchronous detection in the receiver (column 14, lines 34-38). Chalmers also states in column 9, line 66 to column 10, line 1, oversampling occurs in the system. If sampling occurs at the maximum opening of the receiver eye pattern and oversampling is done in the system, then the sampling point is an oversampling point as well. It would have been obvious of one of ordinary skill in the art to shift the sample timing phase so the sampling occurs at the middle point to minimize intersymbol interference as disclosed by Chalmers in the method and system of the combination of Vasic and Yamada.

Regarding claim 3, Vasic discloses a closed loop system that controls the gain in order to maintain optimal transmit power (column 2, lines 49-67).

7 Claims 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Higashi et al (US 5,692,015) in view of Yamada et al (US 5,822,364) further in view of Chalmers (US 5,375,146).

Regarding claims 7, Higashi discloses a coherent detection method and system including a step of estimating a transfer function using pilot signals (abstract). The step of estimating the transfer function including using pilot symbols contained in the received signal as well as pilot symbols generated from a pilot symbol generator (column 5, lines 32-42). The pilot symbols are located before and after the information signal (figure 1). Detection occurs by interpolating the transfer function. The circuit is shown in figure 3. Higashi does not disclose using the complex conjugate for performing the coherent detection. Yamada discloses the demodulated data is obtained after completion of the pilot coherent detection scheme with interpolation using the complex conjugate as stated in column 1, lines 11-38. This is a critical component of correctly computing the coherent detection. It would have been obvious for one of ordinary skill in the art at the time of the invention to combine the coherent detection scheme of Yamada into the detection scheme of Higashi to ensure the correct values are detected. In addition, Higashi does not disclose updating at a middle point of the data frame a reception sampling point. However, Chalmers discloses the circuit shifts the sample timing phase so that the sampling occurs at the maximum opening of the receiver eye pattern (i.e. sampling in the middle of a digital symbol) to minimize intersymbol interference (column 13, lines 19-23). This allows the interpolation synchronous detection in the receiver (column 14, lines 34-38). Chalmers also states in column 9,

line 66 to column 10, line 1, oversampling occurs in the system. If sampling occurs at the maximum opening of the receiver eye pattern and oversampling is done in the system, then the sampling point is an oversampling point as well. It would have been obvious of one of ordinary skill in the art to shift the sample timing phase so the sampling occurs at the middle point to minimize intersymbol interference as disclosed by Chalmers in the method and system of the combination of Higashi and Yamada.

***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

***Contact Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin M. Burd whose telephone number is 703-308-7034. The examiner can normally be reached on Monday - Thursday 9 am - 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad Ghayour can be reached on 703-306-3034. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Kevin M. Burd
7/21/2004